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ABSTRACT

A reform in the grant-in-aid system passed in Illinois in the summer of 1973 was evaluated. The State Changed on that date from a foundation system to a district power equalization system. Operational definitions of fiscal policy goals, such as fiscal neutrality and permissible variance of expenditures, were established and measurements taken pre-reform. Evidence relating to the passage of tax referenda was also introduced. The question of whether the pclicy goal of reward for local effort is incompatible with equity-oriented policy goals in school finance is discussed. (Author)

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A Report of the Center for the Study of Educational Finance

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I. Background

In the summer of 1973 the state of Illinois to a very large extent abandoned the "foundation," or Strayer-Haig-Mort, approach to general purpose educational grants-in-aid for the K-12 jurisdiction, e.g., the "common" schools of the state. (1) The "foundation" approach had dominated Illinois K-12 finance thinking for 46 years, the first foundation or "Strayer-Haig" system having been adopted in this state in 1927. No attempt will be made in this report to provide a detailed exposition of the 1973 Illinois school finance "reform" since that has been done elsewhere. The reader is especially referred to treatments of this subject by Ben C. Hubbard and by Fred Bradshaw. (2) Some general discussion is, nevertheless, essential so that the readers, especially those outside the state, can understand what type of grant-in-aid system is being evaluated.

The current Illinois general purpose educational grant-in-aid can be considered a "district power equalization" system <u>if</u> that DPE label can be used on those state systems where no recapture of funds from the affluent districts takes place as well as in states where recapture is possible. (3) The current Illinois system is similar in fundamental concept to "guaranteed tax yield" or "guaranteed valuation" systems that were pioneered in the states of Wisconsin and Utah after World War II. (4) The original notion of a "local incentive" type of grant-in-aid is not new at all. It was advanced over half a century ago by Professor Harlan Updegraff at the University of Pennsylvania. (5)

The popularity of this type of grant-in-aid system in more modern times is due partially to the efforts of Professor John Coons and his associates. (6) At least for a time, "district power equalization" was considered by some to be the most logical answer to constitutional challenges to state grant-in-aid systems typified by Serrano v. Priest and Rodriquez v. San Antonio. There are some reservations on that point at present. (7) The Illinois allocation reform of the summer of 1973 also has many similarities and some differences with a reform carried out simultaneously in the neighboring state of Michigan known as the "Bursely Act."(8) The reform was also similar in concept, though not in operational detail, to recent DPE reforms in the states of Kansas, Colorado, and Ohio. (9) Within the state the reform is frequently referred to as the "resource equalizer plan" or the "Hoffman-Fawell Act."

Essentially, after 1973, more state funds are provided to districts in Illinois with higher tax rates, lower assessed valuations, and heavier concentrations of Title I eligible pupils. Conversely, lesser amounts of state aid are available to district without these characteristics. It is important to note that the Illinois system, like all "reward for effort" systems, contains both a "tax relief" aspect and a "tax stimulation" aspect. Larger state grants do go to school districts with higher tax rates and similar assessments per pupil at any given point in time and should therefore have the effect of dampening down further increases in rates in these high tax rate districts. However, ceteris parabus, any district, including even the higher rate districts, must raise its local tax rate in order to get additional state support. To put the matter another

way, the only way to get incremental state dollars, other than by a loss of property valuations, an increase in Title I eligibles, or an increase in students, is to raise the local tax rate. In most Illinois districts this cannot be done by board action alone, but must require a successful tax referendum. This assumes of course that the legislature does not make any major changes in the constants in the formula. Since this is the case, a knowledge of the behavior of districts relative to tax referenda is necessary to any understanding of the longer range effects of the Illinois 1973 grant-in-aid reform. A dissertation recently completed at Illinois State University by Tharin Rasanond throws some light on this district tax referenda behavior and relevant findings from that study are included in this report. (10)

The 1973 Illinois reform contains some additional features which should be at least briefly noted. First, Illinois is one of four states (Pennsylvania, Ohio, and Minnesota being the other three) which provides additional dollars based on the concentration of children from poverty families. (11) This is a fairly expensive item in Illinois, accounting for $268,491,779 of the $1,398,111,033 that was calculated for distribution through the general purpose grant-in-aid formula using prorated claims for 1975-76. Nevertheless, it is believed by many to be almost as important, if not more important, than the basic "district power equalization" nature of the allocation formula. This provision for the concentration of poverty children (each state calculates this factor in a different way) rather than for simply the number of poverty children, is a great benefit to the central cities of the state with their ghetto areas and also to rural pockets of poverty in the southernmost regions of the state. There are some additional

complications in the 1973 law. For example, the old flat grants for affluent districts were carried forward as was a calculation peculiar to Illinois called the "alternate method." This later calculation, which came into the Illinois law at the time the income tax was adopted, distributes some limited amount of funds to the top half of the wealth distribution. In addition, a few districts were left with the option to use the older Strayer-Haig allocation method. These last complexities do not, however, affect many school districts and only a small percentage of the students of the state are found in such districts. (12) One can therefore say that the kind of allocation system being evaluated here is basically a DPE or "guaranteed tax yield" formula with a fairly important weighting for socially and economically deprived children included within it. Unlike Michigan and California, Illinois chose to tackle the problem of funding compensatory education by a pupil weighting rather than by a separate categorical or special-purpose grant. The Illinois system therefore leaves the discretion of how to spend these compensatory dollars entirely to local boards of education. There is, at least at the time this was written, no "targeting" of dollars to specific neighborhoods or individual schools within a district. How local boards exercise this discretion will be closely watched by the General Assembly.

II. Design of the Evaluation

This evaluation proceeds in three stages. In the first part we use a set of "equity" criteria which we have used on two previous occasions in Illinois. (13) The feasibility and utility of these equity criteria were also recently demonstrated on data from the states of Michigan and Kansas by Thomas Wei-Chi Yang. (14)

In this report we have provided only the barest explanation of these evaluative techniques. The reader is therefore strongly encouraged to investigate some of the earlier Illinois studies or the Yang study for a fuller exposition of these evaluation procedures. Second, relevant findings from the Rasanond study concerning school district tax referenda behavior in Illinois are summarized and the policy implications of that study are highlighted. Finally, a three-year period is long enough to generate a number of criticisms from practicing superintendents and the nature of some of these criticisms "from the field" is discussed. The report concludes with an outline of research and development needs generated by this backward glance over the last three years.

III. The Equity Evaluation

The equity evaluation is found in Tables 1 through 6. In the first table the criterion is one of overall disparity of expenditures per pupil. It is assumed that the state of Illinois wishes to reduce the variation in expenditures per pupil with the passage of time. This has been referred to in previous studies as the "permissible variance" criterion, e.g., the state will permit some variation from absolute equality in expenditures per pupil, but wishes to at least reduce the current variation. The statistic used is the "coefficient of variation," e.g., the standard deviation divided by the mean and multiplied by 100.

Using the 1972-73 year as the base year, that is, the year prior to the grant-in-aid reform, the variation in elementary districts decreased in the first year of the reform and then increased slightly in the second and third years.

The third year value, however, is still well below the pre-reform level. For high school districts disparity has been reduced in each year since the reform, with the greatest reduction coming in the last of the three years since the reform. For unit districts disparity in expenditures per pupil has likewise been reduced in each year after the reform; however, the greatest reduction did occur in the first year after the reform. While there are variations by organizational classification of school districts and some evidence of non-linear trends, one must conclude that overall inequalities between school districts have been reduced in the three years since the reform. If we can assume that expenditures per pupil are highly correlated with levels of educational services delivered, then differences in educational service levels between Illinois school districts are less in 1975-76 than in 1972-73.

Not all "authorities" in school finance are of the opinion that the overall variance in educational expenditures per pupil should be reduced. A sizeable group are of the opinion that expenditure per pupil variation above the median or mean should not be reduced and that, in fact, the only legitimate concern of the state is with the expenditure per pupil variation below some measurement of central tendency. This group argues that "bringing up low spending districts" should be the primary concern of the state and that higher spending districts should be allowed to move out in front as far as they want to go. Indeed, the more militant of this group hold that there is some type of civil "right" to spend more money on education if that is their preference, relative to other allocations of their tax resources. A number of older school finance scholars held to this policy position, not the least of which was the late Paul Mort of Columbia University.(15) Professor Eugene McLoone of the University of Maryland is a

forceful advocate of this position in the modern era. (16) McLoone has devised several indexes to look at the bottom half of the expenditure distribution. The one used in this report is based upon the percentage of students found below the median expenditure level and the amount of dollars needed to bring all students to the median expenditure in the state. The index is constructed in such a fashion that its value should rise as fewer and fewer students are found below the median expenditure level. Table 2 indicates that the 1973 reform has accomplished this task of bringing up low spending districts in the case of unit districts and high school districts. However, the index for elementary districts does not show this kind of improvement. The apparent lack of improvement of low spending elementary districts should receive further investigation.

The next four tables of the equity analysis are not directly concerned with expenditure disparity between school districts although they are indirectly concerned with resource disparity between local school districts. The concern in these four tables is with the relationship between (a) the wealth of a school district and (b) the expenditures per pupil of a school district. The criterion used here has been discussed elsewhere under the label "fiscal neutrality."(17) It is assumed that the state of Illinois wishes per pupil expenditure to be less of a function of local district wealth than it was in the past. That is, with the passage of time, local district wealth will not determine expenditure levels, and probably service levels, as much as has historically been the case. Both the reduction in expenditure variance and the lessening of wealth as a determinate of expenditures are normally seen as steps toward increasing equality of educational opportunity among students in Illinois. The use of the state fiscal

apparatus as a means of equalizing educational opportunities has been defended elsewhere. (18)

We have used two specifications of this important criterion of "fiscal neutrality" in the evaluations conducted at the Center. The first involves the Gini Index, or "index of concentration" as it is sometimes called. As in previous research reported by Hickrod and his associates, this index is based on a bi-variate set of measurements rather than a univariate set of measurements. (19) That is, both wealth and expenditures (or alternately revenues) are used rather than expenditures alone. This usage is to be contrasted with the traditional Gini applications made by McCloone, Michelson, Grubb, Alexander, and others which are based upon expenditures alone. (20) Since the Gini coefficient has been used several different ways in recent school finance research, it is necessary to ascertain in each piece of research just what kind of application has been made. (21)

Basically what we have done in this bi-variate application is to rank the school districts from low to high upon some specification of wealth. In the Illinois evaluations we have used property valuations per weighted pupil and income per weighted pupil. Once this wealth ranking of districts is completed a cumulative percentage distribution of pupils is then formed starting from the poorest districts and working to the top. A similar cumulative distribution is established for state and local revenues or expenditures. The two cumulative percentage distributions (wealth and expenditures) are then plotted on an X-Y axis. If local wealth were not a factor in expenditures in a given state, the X-Y plot of the two cumulative percentages, wealth and state and local revenues,

would be in fact a straight line. That is, the poorest 10 percent of students would get 10 percent of the available "pie" of state and local monies, the poorest 20 percent would get 20 percent, etc., etc. A distribution of state and local funds would prevail that would be "neutral" of local resource disparities, and this is exactly what is necessary in any operational definition of "fiscal neutrality." We have not found this absolute fiscal neutrality, e.g., the straight line, to prevail in Illinois, Michigan, or Kansas, at least where state and local revenues are concerned. Our investigations at the Center have not employed either federal funds or funds distributed by categorical state programs. The inclusion of federal grants and state categorical grants could alter the observed "fiscal neutrality" situation. When the poorest 10 percent of the students receive less than 10 percent of the funds, the poorest 20 percent less than 20 percent of the state and local revenues, etc., the plotting of the cumulative percentages will result in a curve which departs from the straight line representing absolute fiscal neutrality. This "Lorenz curve" is interesting in and of itself, but researchers usually prefer a numerical value which will describe the extent of the departure of the curve from the straight line. There are several ways of computing such a value, referred to as a Gini index, Gini coefficient, or coefficient of concentration. Appendix A to this paper, prepared by Ramesh Chaudhari, sets forth one possible calculation procedure. Readers interested in examining the computer program for such a calculation should address themselves to Professor Chaudhari at the Illinois State University Computer Center. (22) The Gini values found in Tables 3 and 4 should be interpreted in the following manner: the smaller the value of the coefficient, the closer the state of Illinois

has moved to the goal of fiscal neutrality; that is, larger values indicate a greater departure of the curve from the line. The positive sign indicates that the curve does not cross the hypothetical straight line. Where a negative sign appears, and this occurs only once and is explained below, the curve has crossed the line and the interpretation is made more difficult.

Table 3 indicates that when property valuation per weighted pupil is used as a definition of wealth, the greatest amount of progress was made in the first year after the reform as far as elementary districts are concerned. Progress continued to be made in the second and third years, but at a slightly slower pace. Progress toward fiscal neutrality with regard to high schools is irregular, more progress having been made in the first and third years than in the second year. The unit districts show more progress being made in the second and third year than in the first year. Unit districts are computed two ways, with Chicago in the calculation and without Chicago in the calculation. The size of Chicago has a great effect on the value of the coefficient, and while this is not as important where property valuations are used as a measure of wealth, it is important where income is used as a measurement of wealth. The evidence of Table 3 clearly indicates that where property valuations are taken as a measurement of wealth, Illinois has moved closer to fiscal neutrality in 1975-76 than it was in 1972-73. The low values for the unit district indicate that absolute or complete fiscal neutrality as a state fiscal goal is within striking distance as far as unit districts are concerned. The departure from perfect fiscal neutrality is somewhat greater for the separate elementary and high school districts.

Table 4 contains the same kind of information but income per weighted student is used rather than property valuations per weighted student. For elementary districts there is a steady movement toward fiscal neutrality with the biggest improvement occurring in the first year after the reform. For high school districts there is also a movement toward fiscal neutrality with progress being greatest in the first and third years. Unfortunately, for unit districts the results are not so clear. In the first two years there was a movement away from fiscal neutrality, then in the third year the data indicate a movement toward fiscal neutrality. In fact, the negative sign indicates a condition in which the curve has in fact crossed the line, which means that through at least a part of the schedule, poorer students were receiving more than their proportionate share of state and local dollars. When the curve crosses the line it is difficult to arrive at a straightforward interpretation of the Gini index. When Chicago is dropped from the distribution, a somewhat clearer picture emerges. A movement toward fiscal neutrality is noted in the first two years with a slight reversal in the third year. The difference between the results with and without Chicago reflect the fact that the city of Chicago school district ranks relatively high on most measures of income, at least where measurements of central tendency are used, e.g., median family income, income per student, etc. Thus an increase in grants-in-aid to Chicago will tend to move the state of Illinois away from fiscal neutrality, not toward fiscal neutrality, since on the measurement used, Chicago cannot be considered a "poor" district. The chronic problem of what constitutes a "poor" district in school finance research is beyond the scope of this paper, but it can be observed that research by Hou in Illinois has already demonstrated that three kinds of wealth measurements,

e.g., property valuation, income, and poverty measures (percentage low income, Title I eligibles, etc.) are not related in any simple linear fashion. (23) Chicago, for example, is rich on some income measurements, average on some property valuation measurements, and poor if measures of poverty are used. This fact greatly complicates policy making in Illinois since most of us think in simple linear terms of "rich" vs. "poor."

Complications with the Gini coefficient have led us to use a more familiar tool in financial and economic research, the linear least squares regression. These results are found in Tables 5 and 6. This technique, used also by Michelson (24) and Feldstein (25), regresses expenditures against some measurement of school district wealth, in this case property valuations and income per weighted pupil. Both variables are transformed into their logarithms to facilitate comparisons through time and space. The evidence of Table 5 is the most systematic and regular that we have. In all categories of districts there is a continual improvement toward fiscal neutrality. This is especailly true in unit districts where the slope of the line between property valuation per weighted pupil and expenditures per weighted pupil has been cut in half within a three-year period. It would be noted, however, that the data used in these regressions are not weighted for size of district, that is, Chicago has the same effect on the regression slope as any other district in the state. In the Gini treatments, the larger districts have the greater effects. The evidence using income, rather than property valuations, is not as regular in form but the third year's values are all less than the values prior to the 1973 reform and, therefore, in general, support the findings when property valuations are used as a measurement of

wealth. If simple unweighted linear regression is acceptable as a measurement of fiscal neutrality, then Illinois has moved toward the goal of fiscal neutrality in the last three years. Note also that the regression analysis supports the Gini analysis in the observation that the state is closer to attaining "absolute" fiscal neutrality in unit districts than in either the elementary districts or the high school districts. Both measurement techniques are established in such a manner that a zero reading would constitute "absolute" or "perfect" fiscal neutrality. The reader is again reminded that a zero reading on these measurements would mean fiscal neu trality had been attained relative to local revenues plus state general aid. The addition of state categorical aid, or federal categorical aid, might move the state either further toward, or more likely away from, fiscal neutrality.

During the first two years following the reform of the summer of 1973, the state of Illinois did fully fund the new formula. In the third year, however, that is the 75-76 school year, the effect of the recession on the state's sales tax and income tax was felt, and the state prorated state aid at 94.6%. While this proration certainly caused hardships in individual school districts, we have no evidence that it greatly upset the movement of Illinois toward the state fiscal goals of reducing expenditure disparity and decreasing the reliance of expenditures upon local district wealth. This result would probably be expected since state funds were still increasing at a rapid rate. Between 1972-73 and 1975-76 general state aid, exclusive of state categoricals, increased from $802,600,000 to $1,173,000,000. While the funds thus available were not

enough to "fully fund" the formula in the sense of providing 75% of a district's "entitlement" (the 1973 reform was designed to be phased-in equally over a four-year period), an increase of this magnitude in state aid would certainly be expected to make expenditures less a function of local district wealth and to aid low wealth districts in closing the gap with their more affluent neighbors, especially when the number of students decreased. This would be inevitable unless the distribution formula were malfunctioning in some way to distribute these increased state aid dollars to the more affluent districts. This report indicates no such malfunction. It should be noted, however, that placing a reduction fraction in front of the whole formula is, of course, a means of lowering state aid. If this practice were continued by the General Assembly after the fourth and final year of the phase-in, then it might well have the effect of moving the state away again from the fiscal goals we have highlighted in this and other reports.

The results of the equity analysis in this third year after the formula change are much like those observed in the first two years after the formula change. However, we do not wish anyone lulled into a false sense of security by these results reported by the Center. It is perfectly possible that the progress Illinois has shown in reducing expenditure disparities and moving toward fiscal neutrality in the last three years is a phenomena of the "phase-in" period of funding. To see why this might be so it is necessary to recall that districts are paid during the phase-in period for their <u>past</u> and <u>current</u> effort. Once the formula is fully funded, however, districts will then be paid for their willingness

to exert additional effort. Movement toward state equity goals in this period "beyond full funding" will then turn on the question of what kind of districts are able to pass tax referenda. If poor districts pass the referenda with greater frequency than rich districts, then the movement toward equity goals observed during this last three years will very likely continue on into the "full funding" period. On the other hand, if rich districts pass more referenda than poor districts, then there is apt to be a retreat from equity goals in the period "beyond full finding." Progress toward equity goals is unquestionably assisted by increases in state funding with only little regard to the exact nature of the grant-in-aid formula. However, in district power equalization states, progress toward equity goals is also a matter of just what kind of districts exert the additional effort which the state now proposes to reward. For this reason, in DPE states research on the determinants of effort becomes of crucial importance, including research on the passing of tax referenda.

IV. Evidence from a Referenda Study

Although the Rasanond study was primarily directed toward exploring the determinants of school district behavior relative to tax referenda, there is some evidence in this study that bears at least tangentially upon the evaluation of the 1973 reform of the Illinois grant-in-aid system. Tables 7 and 8, for example, offer some evidence of the success or failure of educational fund tax referenda in Illinois after the passage of the 1973 reform. The reader will note that the success rate has improved if the 20 months of the 1974-75 to

1975-76 period (actually July 1, 1974 to March 1, 1976) are compared to the 1971-72 to 1973-74 period (actually July 1, 1971 to June 30, 1974). The improvement is more striking for unit districts than for elementary districts. No data is provided in the study for high school districts. Note also the increased referenda activity in unit districts; over twice as many referenda were attempted in the second time period as contrasted with the first time period. Granted, that both this increased referenda activity and more favorable passage rate cannot be proven to be a causally connected result of the 1973 reform. It is possible, for example, that the entire "climate" for passing referenda was more favorable in Illinois in the second time period than in the first. This second time period, however, is a time period in which the state was running into increased problems in funding the 1973 reforms as previously mentioned. Did the threat of proration of state aid early in the period and an actual proration of state aid later in the period contribute to a more favorable "climate" to pass referenda? Obviously this matter needs further investigation. The time periods are not equal and the whole problem of which time periods to compare is not easy to answer. An assumption was made in the Rasanond study that the effects of the reform in the summer of 1973 would not start being observable in tax referenda until, at the earliest, one year later in the summer of 1974. There are those who would argue that an even greater "lag" is needed before the public could relate the change in grant-in-aid methods to their voting habits. This small bit of evidence does suggest that a reasonable hypothesis might be that voters in Illinois tax referenda are at least beginning to respond to the "reward for effort" contained in the 1973 reform and that response is in general favorable to school districts.

Tables 9 and 10 contain a portion of Rasanond's discriminant function results, those only for unit districts in Illinois. Looking at assessed valuation per pupil, we can see that the more affluent districts continued to pass referenda more often than poorer districts after the reform, the same as they did before the reform. However, the means are not greatly different for the two groups. An interesting phenomena occurs with regard to median family income. In the time period before the reform it was the richer districts that tended to pass the referenda, but after the reform it was the poorer districts that tended to pass the referenda, and this time there is a sizeable difference in the means of the two groups. It is interesting to note that both before and after the reform it was the districts having the higher expenditure per pupil and the higher median teacher salary that were in the most trouble with their referenda. This fact suggests, but does not prove, an increasing taxpayer resistence to higher teacher salaries in recent years. The finding on percent family income $15,000 and over was quite unexpected. Both before and after the reform the unit districts with the higher percentage of high income families had the greater trouble in passing their referenda. Since this stands in contradiction of several findings to the contrary elsewhere, it obviously needs further investigation. (26) The lack of statistically significant differences is obvious in the two tables and therefore the findings briefly noted here should be taken as no more than material for interesting hypotheses to be tested by further investigations. Rasanond, herself, comments as follows on her empirical models: "The fact that these models explained only between 16 to 34 percent of the variance may have an important implication for school administrators. It may be that those characteristics

other than socio-economic and demographic characteristics used in this study were very important in explaining the variation of the percentage of favorable votes. Those other characteristics might be school-community rapport, school public relations, administrative patterns, campaign strategies, and general perceived quality of education of school districts."(27)

At the cost of redundancy, the authors would like to stress that further research on referenda results and on the related matter of change in tax rates through time is essential if we are to ascertain the long-run results of a "district power equalization" grant-in-aid system of the type passed in Illinois in 1973.

If the richer districts are able to pass referenda and the poor districts are either unable, or unwilling, to pass referenda, then the "rewards" for added effort will, in the long run, tend to move the state away from goals such as fiscal neutrality and reduction of variation in expenditures between districts. However, if the poorer districts rather than the richer districts are the ones who respond to "reward for effort," then equalization goals can be served by DPE systems as well as other kinds of distribution formula. Within the four or five years that the 1973 formula is being phased-in, the sizeable increase in state aid would probably mask most "long-range" effects. However, should the state elect to stay with the "reward for effort" distribution system a few years beyond the end of the phase-in period, which is either this current fiscal year or the next, then it should be possible to observe the effects of this system "at the margin." It is difficult, however, for any economic institutional process to stand still and that is especially true with one as subject to political pressures as is school funding. As this report was being written, the General Assembly

was in the process of making changes that will affect the distribution in the fourth year after the major formula change. However, none of those changes in the fourth year abandon the crucial "reward for effort" principle adopted in 1973. If the state stays with this principle for only two or three more years, it may finally provide that laboratory with which to test whether "reward for effort" is incompatible with basic equity goals.

V. Criticisms of the Working of the Formula from the Field and Some Discussion of the Changes Made that will Affect Future Years' Analyses

Since the beginning of the use of the resource equalizer (1973-74), there have been three basic types of criticisms. However, the General Assembly and the Governor did not make changes in the basic formula until the special session in the fall of 1976.

First, there have been a number of schools that wanted single parts, but nevertheless important parts, changed within the basic context of the formula or which varied only slightly from the basic context. One group wanted the tax rollback provision removed. The law as passed in 1973 carried a provision that unless certain conditions were met, districts receiving aid under the resource equalizer would have to roll their tax rates back to the maximum tax rates that the state would match. Another group wanted to give access to all schools without the necessity of having a referendum. (That is, they wanted elementary and unit districts to be able by board action to go to the maximum tax rate that the state would match.)

A second criticism has been against the concept of how educational need is measured. At present students in the high school are weighted 25% more than other students. Interestingly, there are those who believe that this weighting is too low. In fact, a per capita expenditure for elementary and high school districts in the 1974-75 school year shows that the mean per ADA expenditure per high school pupil exceeds 125% times the elementary mean by 14% ($2,125 - $1,527 = 139%).(28) The chief complaint of this type has, however, been based on the fact that some districts get additional units because of Title I weighting. It should, perhaps, be pointed out that the cities of 10,000 WADA and over have always received some bonuses up to a 16% increase in the WADA of Chicago. A description of the aid which the weighting factor provides to districts is discussed later in this section.

The third type of criticism has been the kind that always occurs when something new is around on which one's woes can be blamed. Some of these problems might be corrected with inexpensive changes while others require serious and large financial commitments by the state. The problems of inflation and declining enrollment are chief among the frustrating problems of schools which have caused much concern by school persons. Many of these problems are not with a formula but with the willingness to meet the problem.

The first group of complaints have been dealt with in part by the legislation enacted in the 1976 fall special session for education. The rollback provision was abolished. What this will do to the spread of expenditure between the "haves" and the "have-nots" in future years will be determined by which districts in the long run are willing to raise taxes. The general suspicion

among researchers and students is that income wealthy districts, whatever their assessed valuation, will be the districts that push their taxes higher.

Those persons who have correctly argued for greater access or for more taxing power so that they could more nearly achieve maximum state assistance made some progress in the special session of 1976. The transportation tax rate was added to those taxes which might be used to secure matching state assistance and the maximum tax necessary to achieve full state participation was lowered from 3% to 2.9% for 12-grade districts and from 1.95% to 1.90% for elementary districts. This is still a long way from making it possible for all districts to have full access by board action, but it does assist in some measure with the problem by providing more dollars to districts not already at the maximum rates that the state will match.

The second problem of how to measure need has not been changed* except as the system used by the federal government to count Title I students has changed. If the Title I count is to continue to be used as the measure of poverty in Illinois, there is a need to adjust the federal count. The system was designed to reduce the Title I count in affluent industrial states and it is working. (The authors do not accept the above statement as desirable, but simply state it as a political fact.) The reduction of number of students in the schools of Illinois is being complicated by the artificial reduction of Title I students, making the loss of funds doubly burdensome to some districts.

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*For a fuller discussion of the way the Title I count is used in Illinois, see an article by Ben C. Hubbard, G. Alan Hickrod, and Robert A. Burnham on pages 57-62 of the 13th Report of the Illinois School Problems Commission.

This could be changed by simply stating what Illinois considers a student from a poverty family. For a fuller discussion of this topic, see Appendix D, which describes how the present count is secured and suggests possible desirable ways to correct the problems caused by the federal count.

The second set of concerns with the use of Title I is usually expressed by those districts which have no students or few students in this category. A majority of the research which we have seen seems to indicate that programs designed for students who need compensatory education will exceed the maximum weighting of .75 that heavily concentrated Title I counts give to schools. One method of putting additional dollars into compensatory programs in districts would be to change the 37.5 weighting to a higher figure. If in the judgment of the General Assembly the .75 was heavy enough for heavy concentrations, then it could be kept as a maximum while moving the 37.5 up. This would distribute more compensatory dollars to all districts except those at the maximum and would move more districts to the .75 weighting.

A third criticism of the payment of compensatory funds as is presently done is that the dollars are not reaching the target population. There is currently only a requirement that districts of 10,000 or more file a plan before receiving funds because of the Title I weighting. There are no penalties and it can even be questioned whether it is correct to single out these districts when some much smaller districts have higher concentrations (see Appendix B).

In an attempt to see what Title I funds would really do if fully funded, the 1974-75 data relative to attendance, assessment, and Title I weightings were used to calculate claims for each district in the state as though the full

impact of the formula were being felt. Appendix B shows the percent of the total claim in those districts which receive 30% or more of their dollars because of the Title I weightings. Appendix C shows the percent of total dollars received by all districts reporting through each county because of the Title I weighting.

When further decisions are made to adjust need, such things as cost of living and income will certainly need to be considered.

Another large area of need is covered by the state through categorical programs. Whether these needs should be a part of the general formula expressed as student weightings or continue to be met by categorical programs is being discussed by many persons, but at this writing no definitive proposals have been introduced in the General Assembly. (29)

The needs area as it is currently measured through the weighting of students in grades 9-12 is challenged by some on the basis that the junior high grades should be weighted more heavily than "1". Still others argue for weighting for kindergarten and primary grades. There is only limited research on what the various levels should cost. It is true that 9-12 grades cost more than 7-8 and that 7-8 cost more than 1-6, but "what is" vs. "what should be" are two different arguments and little research has actually been done on what "should be" the ratio. Nevertheless, it remains an area of contention.

The third group of complaints, sometimes aimed at the formula and sometimes just "aimed," are real problems for the schools. The question of inflation and ways to deal with it was discussed at some length before the formula was introduced. Making the adjustment as the formula was being phased-in

was not considered desirable. Discussion of ways to adjust for inflation has been suggested through time since the adoption of the formula. (30)

The declining enrollment problem has been addressed in part by the legislation passed in the 1976 fall special session. A school district that is losing students could for several years use either the current or previous year's WADA. The new law allows a district to use either the current year or the average of the three previous years. This gives a district some time to adjust expenditures to their decreasing income. Whether further adjustments will be needed in this area can only be determined when it is determined how much help this plan gives to districts and how rapidly districts can or will adjust to the fact of fewer students.

One additional change was made in the law in the fall of 1976 which we in the Center support but which we wish to sound a warning against as a permanent part of the funding program. The 1976 legislation guaranteed districts that they would get as much money with the formula changes as they would have gotten had there been no changes. In a year when proration may cause the decrease, this was admirable. However, the practice of "holding a district harmless" from cuts in state aid because of desirable changes in the formula should be avoided except in extreme circumstances. In some states where districts have been "held harmless" from year to year, history has shown that sooner or later most districts are guaranteed an income. In fact, this can proceed to the point where the whole grant-in-aid formula becomes meaningless. This pitfall should be avoided in Illinois.

A recent criticism of the formula is that it is not flexible. This is true for any district that has not achieved the maximum tax that the state will match. For instance, the formula guarantees all districts the same total dollars, local and state, if they have the same tax rate. Any change upward or downward in the assessed value of a district will not alter the total dollars collected in taxes and claimed from the state. Since the state has not to date paid 100% of the full claim, districts that increase their assessment do get a slight advantage (the amount of the proration cut). With the advent of the new assessment law (HB 990) and the new emphasis on reaching 33 1/3% of real value, a number of districts are having their assessment raised. Persons in these districts argue that with these increases, they pay far more taxes but get no more total dollars for the operation of these schools. This argument is true since the formula was based on the tax rate. The simple answer by other districts that have been at 33 1/3% all along is that those districts below this level have been getting money for years that they were not entitled to receive and it is about time they paid their share. The charge that increased or decreased assessment levels below the guaranteed levels do not increase or decrease dollars, except as state proration of the full claim adjusts, is correct; but it can be considered a strength rather than a weakness depending on who is looking at the problem.

The changes made by House Bills 1, 2, and 3 in the fall of 1976 special session for education made the following changes which will change in some ways the allocation of funds during the fourth year of the formula. This will mean that when the Center evaluates the fourth year allocation, it will not be

based on the exact same law as these first three years had been based on.

The following changes were made in the formula in 1976:

1. Districts which did not have a tax rate high enough to claim the maximum state aid could count taxes collected for transportation as operating taxes.

2. Unit districts could reach the maximum state assistance by taxing at 2.90% instead of 3% and elementary districts could reach the maximum by taxing at 1.9% rather than 1.95%.

3. The rollback provision for districts that taxed beyond the maximum tax rates provided in the original law and all related statutes were repealed.

4. Districts will in the future be allowed to base their claims on the average of the past three years' WADA or the current year's WADA plus the allowable Title I weightings in either case.

5. A provision was added that provided that when state aid was calculated for all districts as the law existed on June 15, 1976, and the appropriation that was made is calculated against that allocation, if the claims are less than the calculations with the new law and the spreading of the appropriations there, districts can file under a "hold harmless" statute for the difference in the two claims. Twenty-five million dollars was appropriated for payment to districts under the hold harmless statutes.

VI. Research and Development Needs in Illinois School Finance

We shall close this report by outlining a number of research and development needs in Illinois school finance. Where we know of research activity

by an individual or individuals, this will be indicated. Looking backward over the last three years we are mindful of Francis Bacon's gloomy observation, "There is no great concurrence between learning and wisdom." Most of what we know simply seems to set the stage for further learning, and wisdom does appear to be far away indeed. To us the central policy question is whether or not Illinois will retain the district power equalization or reward for effort system that the General Assembly adopted in 1973. Research which bears therefore upon that central policy issue must be given high priority. The first need is therefore for studies which will help us determine which districts may exert the greater effort in that period beyond "full funding" of the formula. This would include research on which districts will pass tax referenda. Dr. Thomas W. C. Yang of this Center is pursuing the question of determinants of effort through a grant from the Illinois Office of Education. If we can assume that Illinois will not abandon its reward for effort system in the immediate future, then the second need is for research which explores different measurements of effort. The present system of using the operating tax rate in the district is only one possible specification of the concept of "effort." Effort can also be thought of in terms of the portion of income used to purchase educational services. Such a formulation would then bring an income measurement into the Illinois formula via the "effort" concept. Dr. Daniel Hou and Dr. Warren Carson of the IOE staff have been pursuing this line of inquiry. Thirdly, an income specification might also be brought into the formula through the "ability to pay" aspects of the grant-in-aid system. Dr. Carol E. Hanes of the IOE staff has been investigating this possibility. All efforts to bring an income factor

into the Illinois formula, no matter how it is done, are plagued by the fact that no annual income data is currently available in the state. Despite many, many efforts to get annual income data, the only income data that is available is 1970 federal census income, collected in 1969. Illinois lawmakers are understandably hesitant to write law on the basis of data that may be nine or ten years old before the law takes effect. All of the above matters relate to the basic format of the Illinois system. There are other research needs not so closely related to the DPE system.

The change in the formula in 1973 destroyed most of the financial incentives that were in the system prior to that date for school consolidation and reorganization. No one seems at present to be willing to tackle this fourth subject, possibly because reorganization and consolidation are so politically unpopular in Illinois. However, if the new Governor in Illinois is really serious about improving efficiency in Illinois schools, this aspect of finance cannot be ignored. Prior research has shown an ample amount of diseconomy of scale in Illinois. (31) This Center has proposed further research to the Illinois Office of Education on this matter of reintroducing an incentive in the grant-in-aid system for consolidations and reorganizations. In fact, the 1976 fall session of the General Assembly did reinstate a .05% difference in favor of unit districts versus dual districts.

Fifth, the method by which a specification of poverty is entered into the Illinois formula needs further investigation. There are questions of both substance and procedure here. Many are satisfied with the "concentration" notion

which Illinois shares with three other states, but some want further justifications for sending more funds to areas with heavy concentrations of poverty students. Illinois may also want to create its own poverty measurement and not rely upon the federal definition of poverty over which it has no control (see Appendix D). There is also the matter of "targeting" or "not targeting" these compensatory funds to individual neighborhoods or individual schools after a district "earns" those funds by whatever poverty measurement is finally used. Sixth, there has been a good deal of talk but very little research activity concerning an "inflation adjustment" which might be added to the formula. We suspect the hesitation here springs from the cost to the state of such a factor should it be added to the formula. But there are other possibilities in the "inflation adjustment" area. For example, one notion that needs further exploration is the possibility of a categorical grant to offset price increases in utilities, especially fuel. This "partial" attack on inflation might succeed where the full court press would be considered too expensive for the state to mount. Seventh, regional or geographic cost-of-living adjustments might find several uses in a revised state grant-in-aid formula. Recent research completed by Professor Walter W. McMahon and Mr. Carroll Melton of the University of Illinois for the Illinois Office of Education can be so utilized. For example, it should be possible to use the McMahon-Carroll indexes to adjust an income factor <u>before</u> the income factor is used in the formula, thus more closely reflecting real income differences between school districts. Such an adjustment is possible on either the "effort" and "ability" concepts in the formula, or, in fact, on both concepts.

Eighth, the matter of cost differentials for special education students and vocational students needs to be faced. Dr. William McLure of the University of Illinois has proposed a method for revising the funding of special education and vocational education through an expansion of the pupil weightings. This important research is cited elsewhere in this report. Ninth, the work of this Center has been concentrated these last three years on the effects of the new general purpose grant-in-aid system on equity goals, not upon the equity effects of state categoricals and federal aid. It is entirely possible that much of the equity progress observable when looking only at the general grant-in-aid in Illinois has been offset by the non-equalizing aspects of state categoricals and federal aid. The progress toward equity goals reported here and in two previous reports might melt like an early snow in the heat of: (a) the impact of state categoricals and federal aid, or (b) the passage of referenda by wealthy districts in the period beyond "full funding." If the previous Center reports have painted too bright a picture of the 1973 reforms, we are deliberately adding some darker tones to the composition in this report.

Finally, while we are reasonably satisfied with the measurement tools we have engineered, or borrowed, to measure equity, there is always room for improvement in school finance in measurement techniques. The recent work of William S. Russell suggests that partial or net elasticities of wealth relative to expenditures would be a better specification of fiscal or wealth neutrality than the simple or gross elasticities that we have used these last three years in Illinois. (32) Unfortunately this idea opens up the whole subject of "proper" specification of demand and supply functions for K-12 finance, a

matter upon which there is no little lack of agreement in spite of quite a literature on expenditure functions in education. (33) These ten matters do not exhaust the research possibilities; we have not even mentioned transportation funding and capital funding, nor have we mentioned expanding the "circuit-breaker" concept in Illinois. The latter is also needed if Illinois elects to stay with a strong reward for effort orientation. These items are sufficient to absorb the time and energy of quite a number of individuals. What we need now is some priority in these many research and development possibilities. Without that, we are in danger of superficial investigation of all of them and full development of none of them.

Notes and References

1. There are many good treatments of the various kinds of educational grants-in-aid used in the United States, including the "foundation" programs. Some of these citations would be: Benson, Charles S., "State Aid Patterns" in Burkhead, Jesse (ed.), Public School Finance: Economics and Politics, 1964, Syracuse University Press; Johns, Roe L., "The Development of State Support for the Public Schools," in Johns, Roe L., Kern Alexander, and Dewey Stollar (eds.), Status and Impact of Educational Finance Programs, 1971, Institute for Educational Finance, University of Florida; see also a more detailed analysis in Alternative Programs for Financing Education, also from the Institute, 1971; Hickrod, G. Alan, "Alternative Fiscal Solutions to Equity Problems in Public School Finance," in School Finance in Transition, 1973, Institute for Educational Finance, University of Florida; Cornell, Francis G., "Forms of the Equalization Model for State Aid Apportionment," Journal of Educational Research, June 1965; Barro, Stephen M., "Alternative Post-Serrano Systems and Their Expenditure Implications," in Pincus, John (ed.), School Finance in Transition, 1974, Ballinger Publishing Company; Grubb, W. Norton and Stephan Michelson, States and Schools, 1974, D. C. Heath and Company; Cohn, Elchanan, Economics of State Aid to Education, 1974, Lexington Books; Harrison, Russell S., Equality in Public School Finance, 1976, Lexington Books; in addition to these more technical treatments there are a number of "popular" treatments, the most well known of which is probably: Financing the Public Schools: A Search for Equality, 1973, Phi Delta Kappa, Bloomington, Indiana. All of the standard textbooks on school finance devote at least one or more chapters to these grant-in-aid models. State by state descriptions of grants-in-aid are found in Tron, Esther O. (ed.), Public School Finance Programs, 1975-76, GPO, Washington, D. C.

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4. See Kahl, William, "Wisconsin's State Support Program," and James, H. Thomas, "Analysis of Wisconsin's School Support Program," in Problems and Opportunities in Financing Education, 1959, Committee on Tax Education and School Finance, National Education Association, Washington, D.C.

5. See Johns, R. L., op. cit.

6. Coons, John E., William H. Clune, and Stephen D. Sugarman, Private Wealth and Public Education, 1970, Harvard University Press.

7. Berke, Joel S., Answers to Inequity, 1974, McCutchan Publishing Company; Callahan, John J. and William H. Wilken (eds.), School Finance Reform: A Legislators' Handbook, 1976, National Conference of State Legislatures, Washington, D.C.

8. Caesar, Gene, Robert N. McKerr, and James Phelps, New Equity in Michigan School Finance, 1973, Senate Committee on Education, Lansing, Michigan.

9. There is an extensive literature on both actual legislative changes and potential legislative changes in school finance. A sampling would include: Johns, Thomas L., "School Finance Reform in 1973--An Overview," Planning and Changing, Spring, 1974; Johns, Thomas L., "1975 School Aid Legislation: A Look at Three States," Journal of Education Finance, Winter, 1976; Garms, Walter I., "The Financial Dimensions of Recent School Finance Reforms," Planning and Changing, Summer, 1974; Grubb, W. Norton, "The First Round of Legislative Reforms in the Post-Serrano World," Law and Contemporary Education, Winter-Spring, 1974; Grubb, W. Norton, New Programs of State School Aid, 1974, National Conference of State Legislatures; Callahan and Wilkins, 1976, op. cit. Materials distributed by the Education Finance Center of the Education Commission of the States, Allan Odden, Director, are especially helpful in keeping posted on school finance changes in the several states. These include, School Finance at a Glance, 1975, the work of Marshall Harris, Finance Facts, and the ECS Legislative Review. The address of the Education Finance Center is 300 Lincoln Street, Denver, Colorado 80203. Virtually each time a state makes a study of its school finance system the study team goes back and reviews a considerable amount of finance theory and current legislative studies. To cite only one example of that type of literature: Pierce, Lawrence C., Walter L. Garms, James W. Guthrie, and Michael W. Kirst, State School Finance Alternatives, Center for Educational Policy and Management, 1975, University of Oregon.

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12. Bradshaw, op. cit.

13. Hickrod, G. Alan, Thomas W.C. Yang, Ben C. Hubbard, and Ramesh Chaudhari, Measurable Objectives for School Finance Reform: A Further Evaluation of the Illinois School Finance Reforms of 1973, Center for the Study of Educational Finance, DeGarmo Hall, Illinois State University, Normal, Illinois 61761 (also available as ED 103 977 in the ERIC Document Reproduction System, P.O. Box 190, Arlington, Virginia 22210).

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15. Mort, Paul R., Walter C. Ruesser, and John W. Polley, Public School Finance, 1960, McGraw-Hill.

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TABLE 1

PERMISSIBLE VARIANCE CRITERION
COEFFICIENT OF VARIATION

	72-73	73-74	74-75	75-76
ELEM.	29.4404	26.9674	28.2265	28.2703
HIGH.	28.1906	25.3338	24.2582	21.1215
UNIT.	14.7044	13.4378	13.4112	13.2873

TABLE 2

PERMISSIBLE VARIANCE CRITERION
McLOONE INDEX

	UNIT		HIGH		ELEM	
	INDEX	MEDIAN	INDEX	MEDIAN	INDEX	MEDIAN
72-73	0.90299	$798	0.82809	$928	0.89152	$764
73-74	0.91913	862	0.84944	996	0.87665	851
74-75	0.92161	910	0.85903	1099	0.84688	944
75-76	0.93728	939	0.87029	1159	0.88331	1011

TABLE 3

FISCAL NEUTRALITY
GINI INDEX
USING PROPERTY VALUATION PER TWADA

	72-73	73-74	74-75	75-76
ELEM	0.0995	0.0848	0.0727	0.0604
HIGH	0.0961	0.0844	0.0756	0.0623
UNIT	0.0345	0.0265	0.0143	0.0018
UNIT W/C	0.0506	0.0387	0.0268	0.0097

TABLE 4

FISCAL NEUTRALITY
GINI INDEX
USING INCOME PER TWADA

	72-73	73-74	74-75	75-76
ELEM	0.0959	0.0785	0.0711	0.0674
HIGH	0.1005	0.0821	0.0697	0.0535
UNIT	0.0139	0.0179	0.0236	-0.0311
UNIT W/C	0.0440	0.0370	0.0294	0.0325

TABLE 5

FISCAL NEUTRALITY CRITERION
REGRESSION APPROACH
USING PROPERTY VALUATION PER TWADA

	72-73	73-74	74-75	75-76
ELEM	0.27679	0.24592	0.23293	0.22803
HIGH	0.44843	0.39949	0.34834	0.28896
UNIT	0.21691	0.17640	0.13493	0.10890
UNIT W/C	0.21693	0.17642	0.13478	0.10302

TABLE 6

FISCAL NEUTRALITY
REGRESSION APPROACH
USING INCOME PER TWADA

	72-73	73-74	74-75	75-76
ELEM	0.31991	0.31165	0.23250	0.22592
HIGH	0.13539	0.16639	0.14900	0.12625
UNIT	0.16484	0.16530	0.09290	0.12546
UNIT W/C	0.16649	0.16621	0.09264	0.09670

TABLE 7

NUMBER OF ELEMENTARY SCHOOL DISTRICTS HOLDING EDUCATION FUND TAX REFERENDA

Year	Passed	Failed	Total
1971-72 to 1973-74	45 (47.37%)	50 (52.63%)	95
1974-75 to 1975-76	38 (52.05%)	35 (47.95%)	73

TABLE 8

NUMBER OF UNIT SCHOOL DISTRICTS HOLDING EDUCATION FUND TAX REFERENDA

Year	Passed	Failed	Total
1971-72 to 1973-74	18 (34.62%)	34 (65.38%)	52
1974-75 to 1975-76	57 (50.00%)	56 (50.00%)	113

TABLE 9

SELECTED FISCAL CHARACTERISTICS AND REFERENDA RESULTS
UNIT DISTRICTS, 1971-72 TO 1973-74

Variables	Means Group 1 (Approved)	Standard Error	Means Group 2 (Rejected)	Standard Error	F
W_1, Assessed valuation per pupil	28538.89	1784.18	27443.46	2343.10	0.10
C_1, Expenditure per pupil	1177.92	23.25	1203.67	44.58	0.16
W_2, Percent family income $15,000 & over	15.02	1.39	16.29	0.91	0.63
C_5, Median teacher salary	9794.50	219.83	10070.88	187.07	0.83
W_4, Median family income	9288.66	305.81	9204.73	240.41	0.04
C_2, Price	0.54	0.04	0.50	0.02	0.81
Number of districts	18		34		

TABLE 10

SELECTED FISCAL CHARACTERISTICS AND REFERENDA RESULTS
UNIT DISTRICTS, 1974-75 TO 1975-76

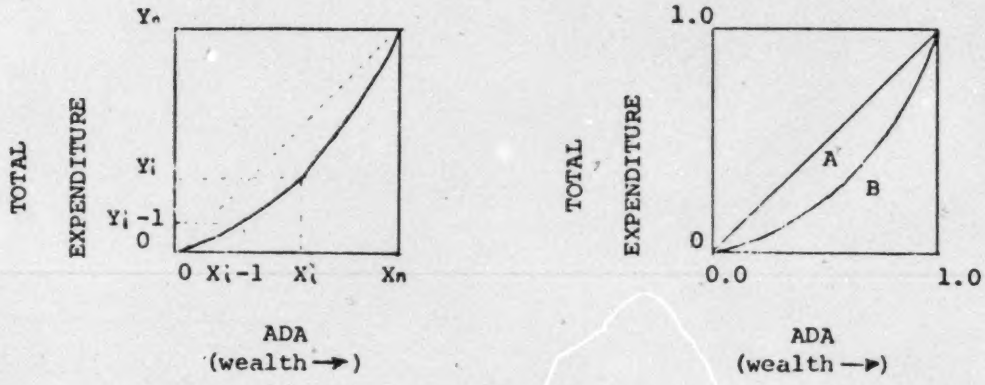
Variables	Means Group 1 (Approved)	Standard Error	Means Group 2 (Rejected)	Standard Error	F
W_1, Assessed valuation per pupil	32659.68	1668.32	31365.34	1437.27	0.35
G_1, Expenditure per pupil	1359.48	22.72	1415.64	40.73	1.53
W_2, Percent family income $15,000 & over	15.89	0.83	17.65	0.90	2.07
C_5, Median teacher salary	11718.21	153.46	13548.57	1578.12	1.36
W_4, Median family income[a]	9106.79	182.30	9540.66	187.16	2.78[a]
C_2, Price	0.58	0.02	0.56	0.02	0.77
Number of districts	57		57		

[a]Significant beyond the .10 level with 1 and 111 degrees of freedom.

APPENDIX A

COMPUTATION OF GINI COEFFICIENT

The districts are sorted in ascending order of wealth per pupil. The cumulative proportions of pupils in the districts are represented by the horizontal axis and the cumulative proportions of total operating expenditures accounted for by these districts are represented by the



vertical axis. The curve thus plotted would be a straight line if the operating expenditures per pupil were the same in all districts. A sagging curve represents lesser expenditure in poorer districts. The measure of this inequality as defined by Gini Coefficient G is given by the formula:

$$G = \frac{\text{Area A}}{\text{Area (A+B)}}$$

or after further simplication

$$G = \frac{0{\cdot}5 - \text{Area B}}{0{\cdot}5}$$

$$= 1 - 2\text{Area B} \qquad (1)$$

Area B is the area under the curve and if n is the number of districts, and

X_i = cumulative proportion of ADA for the ith district

y_i = cumulative proportion of $ for the ith district

$$\text{Then Area B} = \sum_{i=1}^{n} \frac{(x_i - x_{i-1})\ (y_{i-1} + y_i)}{2}$$

$$\text{or 2 Area B} = \sum_{i=1}^{n} (x_i y_{i-1} - x_{i-1} y_{i-1} + x_i y_i - x_{i-1} y_i)$$

$$= (x_i y_0 - x_0 y_0 + x_1 y_1 - x_0 y_1$$

$$+ x_2 y_1 - x_1 y_1 + x_2 y_2 - x_1 y_2$$

$$+ x_n y_{n-1} - x_{n-1} y_{n-1} + x_n y_n - x_{n-1} y_n)$$

$$= (x_2 y_1 - x_1 y_2) + (x_3 y_2 - x_2 y_3) + \ldots$$

$$+ (x_n y_{n-1} - x_{n-1} y_n) + x_n y_n$$

$$= \sum_{i=2}^{n} (x_i y_{i-1} - x_{i-1} y_i) + 1 \qquad (2)$$

$$= 1 - \sum_{i=2}^{n} (x_{i-1} y_i - x_i y_{i-1})$$

substituting the value of area B in eq 1

$$G = \sum_{i=2}^{n} (x_{i-1} y_i - x_i y_{i-1}) \qquad (3)$$

APPENDIX B

RANK ORDER OF SCHOOL DISTRICTS WHICH RECEIVED 30% OR MORE OF THEIR FULL STATE AID CLAIM BECAUSE OF TITLE I STUDENTS BASED ON DATA FOR THE 1974-75 SCHOOL YEAR AS A PROJECTION FOR THE 1975-76 YEAR

Rank Order	County	School District	Percent
1	Perry	Community 211	78.69
2	Ogle	Kings 144	67.58
3	Franklin	Akin 91	60.17
4	Fulton	South Fulton 330	58.84
5	Jefferson	Waltonville 1	56.47
6	Randolph	Kaskaskia Island 124	53.78
7	Gallatin	North Gallatin	48.63
8	Washington	Ashley 15	48.31
9	Cook	City of Chicago 2990	47.82
10	Alexander	Cairo 1	46.31
11	Fayette	Farina-LaGrove 206	43.82
12	St. Clair	Brooklyn 188	42.76
	St. Clair	East St. Louis 189	42.52
13	Pulaski	Meridian 101	40.07
14	Coles	Oakland 5	39.76
15	Menard	Greenview 200	39.62
	Cook	East Chicago Heights 1690	39.33
16	Kankakee	Pembroke 259	38.85
17	Clay	Clay City 10	37.81
18	Clinton	St. Rose	37.19
	Cook	Posen-Robbins 1435	36.94
	Kankakee	St. Anne 302	35.08

Rank Order	County	School District	Percent
19	Iroquois	Stockland 253	34.94
	Douglas	Artuhr 305	33.99
20	Jefferson	Mt. Vernon 80	33.92
	Cook	Chicago Heights 1700	33.86
	Pulaski	Century 100	32.95
21	LaSalle	Freedom 245	32.80
	LaSalle	Lostant 400	32.03
	Jefferson	Grand Prairie 6	31.87
	Jefferson	Farrington 99	31.08
22	Pope	Pope 1	30.81
23	Wayne	Wayne City 100	30.68
	Kankakee	Wichert 262	30.37

APPENDIX C

RANK ORDER OF COUNTIES IN TERMS OF AVERAGE PERCENT OF TOTAL DISTRICT CLAIMS BASED ON TITLE I STUDENTS BASED ON DATA FOR THE 1974-75 SCHOOL YEAR AS A PROJECTION FOR THE 1975-76 YEAR

Rank Order	County	Percent
1	Pulaski	37.96
2	Alexander	37.57
3	Cook	30.90
4	Pope	30.81
5	Hardin	28.21
6	Gallatin	27.40
7	Hamilton	26.93
8	St. Clair	25.60
9	Jefferson	18.27
10	Lawrence	18.18
11	Wayne	18.10
12	Fayette	16.82
13	Greene	16.47
14	Union	16.19
15	Pike	16.01
16	Saline	15.88
17	Montgomery	15.76
18	Morgan	15.22
19	Jasper	14.97
20	Schuyler	14.80
21	White	13.67
22	Douglas	13.60
23	Kankakee	13.35
24	Peoria	13.16
25	Brown	12.84
26	Sangamon	12.78
27	Massac	12.73
28	Jackson	12.67
29	Franklin	12.60
30	Clay	11.95
31	Scott	11.65
32	Cumberland	11.48
33	Edwards	11.46
34	Stark	11.29
35	Calhoun	10.77
36	Washington	10.69
37	Moultrie	10.65
38	Hancock	10.38
39	Marion	10.12
40	Champaign	10.09

Rank Order	County	Percent
41	Effingham	9.94
42	Cass	9.87
43	Marshall	9.77
44	Menard	9.67
45	Bond	9.56
46	Coles	9.51
47	Shelby	9.26
48	Wabash	9.20
49	Jersey	9.19
50	Williamson	9.05
51	Adams	8.67
52	Putnam	8.50
53	Ford	8.49
54	Edgar	8.49
55	McLean	8.46
56	Vermilion	8.37
57	Richland	8.34
58	Piatt	8.23
59	Clinton	8.21
60	Winnebago	8.12
61	Macon	7.81
62	Clark	7.79
63	Warren	7.65
64	Christian	6.86
65	Madison	6.63
66	Iroquois	6.41
67	Crawford	6.34
68	Henderson	6.16
69	Mason	5.80
70	Perry	5.77
71	Randolph	5.74
72	Rock Island	5.53
73	Johnson	5.43
74	Fulton	5.37
75	Knox	5.35
76	Lee	5.07
77	Mercer	5.01
78	Jo Daviess	4.92
79	Livingston	4.85
80	Whiteside	4.71
81	McDonough	4.56
82	Logan	4.25
83	Will	4.01
84	DeWitt	3.79
85	Macoupin	3.63
86	Ogle	3.51

Rank Order	County	Percent
87	Bureau	3.39
88	LaSalle	3.32
89	Henry	3.27
90	Stephenson	3.08
91	Woodford	2.93
92	Lake	2.49
93	Carroll	2.48
94	Monroe	2.46
95	Kane	1.73
96	Tazewell	1.71
97	Grundy	1.64
98	DeKalb	1.47
99	Boone	1.43
100	McHenry	1.40
101	DuPage	.51
102	Kendall	.33

APPENDIX D

AN ANALYSIS OF THE PROCEDURES FOR DETERMINING THE NUMBER OF CHILDREN BELOW POVERTY LEVEL

by
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Because considerable sums of money are distributed to local school districts on the basis of the number of children in low income families, it is important to understand the procedures involved in deriving such statistics. It is even more important to evaluate the adequacy of the data available for this purpose. Finally it is desirable to consider recommendations for the improvement of the data.

Procedures for Deriving Statistics

The number of low income children classified as Title I eligibles is obtained from three sources. The tabulation of most of these children is derived from the 1970 Census of Population. The second largest number is calculated as 2/3 of the children from families on ADC above the poverty level with the basic information coming from the Illinois Department of Public Aid. Finally, the Illinois Department of Children and Family Services has the data on foster children or those under the legal guardianship of the state.

To understand the procedures involved it is desirable first to review the Orshansky Index. This index is basic to the derivation of the first two sets of data identified above.

The Orshansky Index

Public Law 93-380 of 1974 amended the ESEA Act of 1965 to provide that the Commissioner of Education shall determine the number of children aged five to seventeen, inclusive, on the basis of families below the poverty level.

Since he is directed to use the 1970 Census, the criteria are based on the Orshansky Index. Similarly, the Secretary of HEW must determine the number of children from families receiving aid to dependent children with income above the poverty level as based on the Orshansky formula. In this case the poverty level is for a nonfarm family of four, updated each year by increases in the Consumer Price Index.

The criteria for determining poverty level in the U.S. are based on the work of Mollie Orshansky (1965) and decisions by a Federal Interagency Committee. Starting with a 1955 survey of food consumption, the Department of Agriculture (1957) had derived a nutritionally adequate economy food plan for use when funds are low. It was determined that the cost of such a good plan was approximately one-third the amount needed for families of three or more to cover all necessities.

Poverty statistics based on the updated costs as of 1963 were prepared by Orshansky and adapted by the Social Security Administration with cutoffs for various types of families and individuals. Revised by the Federal Interagency Committee in 1969 (U.S. Bureau of the Census, 1969), the index includes a series of income cutoffs adjusted for family or unrelated individual (under or over 65). Since then the figures are revised annually to reflect changes in the Consumer Price Index. The cutoff levels for 1970 as based on 1969 income are presented in Table A.

1970 Census Data

The major portion of the children eligible under Title I was obtained in 1970 from a twenty-percent sample of households, so that the number of children

TABLE A. Weighted Average Thresholds at the Poverty Level in 1969, by Size of Family and Sex of Head, by Farm and Nonfarm Residence

Size of family	Total	Nonfarm			Farm		
		Total	Male head	Female head	Total	Male head	Female head
All unrelated individuals	$1,834	$1,840	$1,923	$1,792	$1,569	$1,607	$1,512
Under 65 years	1,888	1,893	1,974	1,826	1,641	1,678	1,552
65 years and over	1,749	1,757	1,773	1,751	1,498	1,508	1,487
All families	3,388	3,410	3,451	3,082	2,954	2,965	2,757
2 persons	2,364	2,383	2,394	2,320	2,012	2,017	1,931
Head under 65 years	2,441	2,458	2,473	2,373	2,093	2,100	1,984
Head 65 years and over	2,194	2,215	2,217	2,202	1,882	1,883	1,861
3 persons	2,906	2,924	2,937	2,830	2,480	2,485	2,395
4 persons	3,721	3,743	3,745	3,725	3,195	3,197	3,159
5 persons	4,386	4,415	4,418	4,377	3,769	3,770	3,761
6 persons	4,921	4,958	4,962	4,917	4,244	4,245	4,205
7 or more persons	6,034	6,101	6,116	5,952	5,182	5,185	5,129

Source: U.S. Bureau of the Census, 1972.

5 to 17 inclusive in families below the poverty level was an expansion of the sample. The data were prepared according to school districts as a joint effort of the U.S. Office of Education and the Bureau of the Census using the Fourth Count Summary Tapes. Because school districts are not coterminous with other geographicsl areas tabulated by the Bureau, it was necessary to prepare a reference list indicating the percentage of area of each census tract or minor civil division (e.g. township) falling in each school district. Such percentages were then applied to the data such as income statistics and aggregated to the school district level.

Release of the Special Fifth Count Census Tapes, providing data by enumeration districts and blockgroups (about one-fifth the size of census tracts), made it possible to generate more accurate data for Fiscal Year 1977. The preparation of the new school district tape based on the Fifth Count for Illinois was accomplished at Illinois State University.

Ordinarily school district data have been prepared only for districts with an enrollment of 300 or over. For a few states including Illinois, however, statistics for all districts were released.

AFDC and Foster Children

The number of children 5-17 from families on ADC with income above the poverty level and those under the legal guardianship of the state have been obtained from the Illinois Department of Public Aid and the Illinois Department of Children and Family Services, respectively. Because names were withheld, it has been necessary to judge the school district involved from the address, a very difficult and inaccurate undertaking with respect to many addresses. Accordingly for FY '77 the Illinois Office of Education arranged to have the IDPA and DFCS mail out cards for each child to the families on ADC and in foster homes, respectively. The families were instructed to have their children take these cards to the school being attended. Private schools were asked to forward the cards to the appropriate public school. Each principal was instructed to insert a unique code for his school and forward the cards to the IOE so as to be credited with the proper number of Title I eligibles in his district. A follow-up mailing was made to those whose cards were not returned. After a reasonable period of time, for all cases of non-response the remaining children were assigned to the most probable school district. As indicated above, only 2/3 of the AFDC children may be counted as eligibles.

Adequacy of the Data

Without a question there are serious inadequacies in these data. Some of these may have been remedied by recent endeavors, but others require changes in the law.

One of the most annoying inadequacies in the present system is the inability of either a school district or the Illinois Office of Education to obtain directly the number of foster children and children in AFDC families residing within the district. The cumbersome system described above is expensive, time-consuming, and inaccurate.

Inadequacies in the Census

Turning to the census data, we should note both the inadequacies in the census in general and specific problems relevant to Title I eligibles. A major problem from the very beginning is the undercount of the population. Overall nationally 5.3 million or 2.5 percent of the population are estimated as missed in the census. More significantly the undercount was probably much higher for low income families. The Census Bureau itself admits this situation and, for example, estimates that 8.6 percent of black children under 10 years of age were not counted (Casserly, 1973). In all likelihood these children were primarily from low income families.

Other respondents who did complete the census questionnaire may have purposely or inadvertently falsified their incomes. Usually these returns offset each other, but in some localities the norm may be to understate, whereas in other districts to overstate one's income.

There are, of course, processing and other errors in the census, but for our purposes we can assume that these are minor in most cases. Some glaring and obvious errors, however, do show up in the data.

More critical than the above inadequacies is the fact that income data was obtained from only a 20 percent sample of all households and then expanded to

represent the total population. For areas such as counties this approach is highly accurate, but for small areas the sampling error can be exceptionally large.

Inadequacies in School District Census Data

Turning from general problems of the census to those specifically relevant to school district and Title I eligibles, the major problem has been the lack of identification of the school district on the census questionnaires. As a result the Census Bureau cannot tabulate census data directly by school districts the way it does for cities or counties. To obtain the information by school districts the Bureau matched the boundaries of census-defined areas with the irregular boundaries of school districts. A high percentage of school district maps are obsolete, vague, and even inaccurate so that even with the best of care the matching job is not very precise. Also in the process some areas may not be found and bits of territory are sometimes unassigned. Such deficiencies were apparent when the school district census tapes were released from Washington. For Illinois there were over 500 areas not assigned to a school district including some with populations in the thousands, and there were numerous other areas misassigned (Pohlmann, 1975). With financial assistance from the Illinois Office of Education, demographers at Illinois State University checked the maps and made significant corrections in the original tapes.

The approach described above is also based on the questionable assumption that population and specifically low income families are evenly distributed throughout a census tract (CT) or minor civil division (MCD) such as a township. By matching maps one can determine the percentage of the area of a CT or MCD falling in a given school district and apply that percentage to the

population data. Because some CT's and MCD's cover large areas, it is possible that the population is very unevenly distributed. At the extreme it is conceivable that four school districts each cover 25 percent of the area of a MCD and each is credited with one-fourth of the Title I eligibles in the MCD. In reality, however, all of the low income families may live within one school district.

The release of the Fifth Count File C Census tapes by the Census Bureau has helped in part to reduce this kind of error. These new tapes provide data by enumeration districts (ED's) and block groups (BG's), which on the average are about one-fifth as large as CT's and MCD's. With financing by the Illinois Office of Education demographers at ISU completely redid the 1970 Census by school districts in Illinois using the new tapes. The evidence indicates a more accurate representation of the population (Pohlmann, 1976). Unfortunately some ED's are still as large as townships, some matching of boundaries is still subject to error, and percent of area remains the primary basis for distributing low income families to school districts which share the same ED. Evidence of population concentration was taken into account as much as possible here at ISU in assigning percentages, but there is nothing on the map to indicate pockets of poverty. Currently field studies are being conducted in some areas in an attempt to obtain better results.

A final problem in using the 1970 Census if the lack of information on the number of children ages 5 to 17 inclusive below the poverty level. One source provides data on ages 6 to 17 and another on 0-17, requiring that estimates be made on the basis of the distribution of children by age.

The Growing Obsolesence of 1970 Data

The use of 1970 Census data becomes less definsible each year for two reasons. In the first place our very rapidly changing society produces shifts in school-age populations and changes in the number below poverty level.

The second reason stems from the 1974 amendment to the ESEA, limiting to two-thirds the number of children in AFDC families above the poverty level who may be counted as eligibles and at the same time raising the poverty level each year. Thus fewer of these children are eligible each year while the number below the poverty level remains fixed at the 1970 Census figure. According to the Illinois Office of Education the number of Title I eligibles allowed by the U. S. Office of Education has dropped from 430, 435 in FY '73 to 381, 627 in the current year, a loss of 48, 808. Depending on local circumstances this drop has much greater impact on some districts than on others. There is reason to believe that the number below poverty level may have actually increased in the very districts which lose these AFDC eligibles.

Confirmation of this contention is found in part in the Current Population Reports released by the Bureau of the Census. For the period 1969 to 1974 the Bureau (1975:17) reports that the number of related children under 18 in families below the poverty level increased from 9, 501, 000 to 10, 196, 000 or 7.32 percent. Applying this percentage to the 305, 093 eligibles allowed to Illinois on the basis of the 1970 Census (1969 income) the state should have an increase of at least 22, 318. Moreover it should be noted that this adjustment does not reflect the severe recession year 1975. Unfortunately there is no indication which school districts are most adversely affected by failure to make such an adjustment.

Recommendations

There are inequities in the distribution of funds based upon various formulae which utilize data on Title I eligibles. Such inequities result from both inadequate data and the declining number of eligibles under present laws. In view of these circumstances I believe that the following recommendations are in order.

1. Amend the statutes of Illinois to include as low income in any weighting of the school aid formula those children on ADC who are not currently being counted. The law should include those designated as below the poverty level as of the 1970 Census plus those on ADC above the poverty level cutoff as of 1970, including two-thirds of those on ADC above the current annual poverty level. Although this approach would count some children twice if the family income has risen above the 1970 poverty level, this would be offset by not counting some children not on ADC, even though the family income falls below the current annual poverty level. Data on children in this latter category are not readily available.

2. Amend the statutes of Illinois to require the Illinois Department of Public Aid and the Illinois Department of Children and Family Services to provide directly to the Illinois Office of Education full and detailed information, including name, address, and school district of residence of each child to be counted in weighting the school aid formula.

3. Work for a change in federal laws to update 1970 Census data by counting all children from families receiving ADC.

4. Permit school districts affected by in-migration to update information on the number of Title I eligibles through a current census. (The precedent

for this exists in other funding measures such as the distribution of motor fuel taxes.)

5. Attempt to get the Bureau of the Census to admit errors in the 1970 Census where evidence can be produced to document such errors.

6. Work now for improvements in the 1980 Census including (a) identification of school districts on the questionnaire, (b) a statewide program to prepare very accurate and detailed maps of school districts, and (c) urging the Census Bureau to secure income data from every household instead of a twenty-percent sample.

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